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To Study On Rural Road Networking Planning With Balancing With High Potency

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Abstract: **To provide for people's needs in the future, further improvements of the road network are a necessity. Simultaneously, harmful effects of this network on both local inhabitants and the flora and fauna become more penetrating. So, sustainable land use planning creates a great challenge for rural road network planning. To serve interests of both accessibility and a sustainable environment, a new planning approach must be developed. This approach also should tackle the problem of traffic unsafely on minor rural roads. The spatial concept of the Traffic Calmed Rural Area (TCRA) is presented as a solution to the dilemma between improving accessibility and damaging the environment. The concept will result in a concentration of present diffuse flows at the minor rural roads at a few trunk roads. So, traffic volumes and speeds within the region will decrease. For two regions, several impacts of the TCRA concept (on volumes, accessibility and environment) are calculated. These examples emphasize the possibilities of the concept to enable a sustainable development.**

Keywords: **Traffic Lights; TCRA; Volumes; Typical Traffic; Trunk Roads;**

1. INTRODUCTION:

As roads are the only means of transport available to most of the rural settlements, it plays a predominant role in the comprehensive development of a society. It acts as the lifeline of the rural economy and society thereby generating increased agricultural productivity, non-agriculture employment as well as non-agricultural productivity, which in turn expands rural growth opportunities and real income through which poverty can be reduced. The importance of rural roads extends to all aspects of economic and social development of rural communities. As a result, planning for rural roads has been driven by a multiplicity of objectives and institutions with lack of continuity and lack of attention to sustainability, and generally poor use of resources. In general rural transport policies take many forms. In most cases they are a component of a broader transport sector policy or rural development policy. In this sense, a stand-alone rural transport policy may not exist, particularly if rural roads and rural development are responsibility of different sector ministries. However, important policy objectives may be embodied within rural development programmes, or rural roads investments programmes.

2. RELATED STUDY:

ROUTE PLANNING

Planning with respect to road construction takes into account present and future uses of the transportation system to assure maximum service with a minimum of financial and environmental cost. The main objective of this initial phase of road development is to establish specific goals and prescriptions for road network development along with the more general location needs. These goals must result from a coordinated effort between the road engineer and the land manager, forester, geologist, soil scientist, hydrologist, biologist and others who would have knowledge or recommendations regarding alternatives or solutions to specific problems. The pattern of the road network will govern the total area disturbed by road construction.

2.3.2 Pramen K Sherstha et al (2000) proposed Road Maintenance Tool For Rural Roads In Kenya concentrated on Progress made on the contract which is recorded on a monthly basis, and the reports are generated on a monthly, quarterly, or yearly basis for each region or for an entire country. To perform these works more efficiently, software known as the Road Maintenance Management System (RMMS) was designed and implemented in 47 regions of the Kenya Rural Road Authority (KRRA), Africa. The software is capable of tracking the change orders in every activity in the work plan and recording the construction progress in detail. As a main objective, this paper discusses the framework of the RMMS system. This paper also identifies five main road maintenance activities that experienced a high number of change orders for road maintenance projects of Kenya.

2.3.3 Shuang Zhang et al proposed Rural Road Network Layout Using FCM Clustering Algorithm and Traffic Location Method in which a Road network layout is prepared which is core part of the road network planning system; its rationality and feasibility directly impact the success of road network planning. Based on the

characteristics and research of rural road network layout, a method which combines Fuzzy C-Means (FCM)) clustering algorithm and traffic location method was used.

J. K. Shrestha et al(2000) proposed a Methodology for Definition of Road Networks in Rural Areas of Nepal which provided a practical method for the development of rural road networks in rural areas of developing countries. This methodology enables to determine obligatory points in the rural road network maximizing the number of settlements that have access to basic services within a given maximum distance. In order to define a rural road network, a methodology composed of two phases is proposed in this paper. The Minimum Spanning Tree obtained through this process can be considered as the minimum level of road connectivity in rural areas (such as in Nepal). The proposed methodology can be divided into two main phases. The first phase is focuses on identifying the nodal points in the rural areas, while the second phase focuses on generating the rural road network connecting the nodal points previously identified.

Chris Hoban et al(2008) proposed Rural Road Maintenance and Improvement stratergy in which rural road strategy that involved many aspects such as relevant agencies, clarify ownership, identification of local institution for policy coordination and local assistance, access capacity to fund, manage and supervise maintenance, preparing plans for maintenance capacity of building. They proposed core networks are to be maintained by road agencies and local government and encourage community effort to maintain non-core roads. They have given first priority for maintenance of already laid roads which ensured full road sector participation in rural road projects initiated by agriculture and rural development agencies. This approach involves local representatives in priority setting, aided by technical data and expert advice on constraints, benefits and cost-effectiveness of alternatives id done and identification of monitor able indicators of road service, and consider independent audits is necessary.

Mineetha (1992), in her work on "Generation and testing of alternatives for rural road network development a case study of Kozhikode District", has made an attempt to identify village hierarchy based on the trip rate produced from each village. Factor analysis was used for analysis.

3. METHODOLOGY:

Urbanisation is most visible through the spread of built-up areas, business parks and the creation of large transport networks and hubs. Change in the relationship between rural and urban land uses has major consequences both for people's quality of life and for the environment. Inefficient land use patterns result in economic, social and environmental costs both at urban level as well as rural level. Examples of these costs are the need to maintain transport and social infrastructures over larger areas, distorted land prices, and increased energy consumption and emission of greenhouse gases as a result of commuting. It can erode the character, identity and attractiveness of cultural landscapes at both the levels in urban and rural context. Hence development of urban functionalities in rural development is an apt solution for sustainable living. The development of rural infrastructure in these lines that creates a balance in urban and rural environment is the need of the day for developing nations. The infrastructure thus developed will follow uniform land use and planned development in the rural areas. The planning strategies for developing such infrastructure should incorporate all the elements that maximize the utility of natural resources, spatial growth of the area and its linkages with the neighbourhood network and areas.

The methodology for development of sustainable rural road network planning with a balance of urban and rural development using artificial neural networks is presented in the following modules.

1. Selection of the study area.

2. Development of GIS base map of the study area.

a) Collection of the topo-sheets from Survey of India.
b) Scans of Revenue divisions from the Census Book.
c) Digitization of the topo-sheeets and revenue division scans in AUTO-CAD.
d) Mosaicing of the both revenue and topo-sheets maps.
e) Updating of the road networks from Google earth.
f) Preparation of the Data Base – EXCEL sheets from the census book.
g) Preparation of excels sheets from census book for parameters taken into consideration for accessing the demand potential
h) Identification of attributes defining the connectivity patronages with an objective of maximization of natural resources.
i) Accessing the demand potential for each village based on the points given to the parameters considered.
j) Integration of spatial and non-spatial data.

3. Exploration and evaluation of urban – rural linkages in the neighbourhood areas using web-based Online Management & Monitoring System (OMMS).

4. Comparison of rural network with the proximity urban spatial structures / similar areas in the region.

5. Identification of demand potential of the villages in rural areas with the elements / attributes finalized in excel sheets and attaching the data to the map in ARC GIS 10.1.

6. Modeling spatial growth patterns of the study area using thematic mapping in ARC GIS 10.1

7. Clustering of villages with reference to the demand potential, linkage patterns and spatial structures using k-means clustering algorithm.

8. Integration of the cluster into GIS.

9. Road Network development.

10. Validation of the approach to check the model accuracy.

4. SIMULATION ANALYSIS:

A geographic information system (GIS) is a system designed to capture, store, manipulate, analyze, manage, and present all types of spatial or geographical data. The acronym GIS is sometimes used for geographical information science or geospatial information studies to refer to the academic discipline or career of working with geographic information systems and is a large domain within the broader academic discipline of Geo-informatics. What goes beyond a GIS is a spatial data infrastructure, a concept that has no such restrictive boundaries. In a general sense, the term describes any information system that integrates stores, edits, analyzes, shares, and displays geographic information. GIS applications are tools that allow users to create interactive queries (user-created searches), analyze spatial information, edit data in maps, and present the results of all these operations. Geographic information science is the science underlying geographic concepts, applications, and systems. GIS is a broad term that can refer to a number of different technologies, processes, and methods. It is attached to many operations and has many applications related to engineering, planning, management, transport/logistics, insurance, telecommunications, and business. For that reason, GIS and location intelligence applications can be the foundation for many location-enabled services that rely on analysis and visualization. GIS can relate unrelated information by using location as the key index variable. Locations or extents in the Earth space–time may be recorded as dates/times of occurrence, and x, y, and z coordinates representing, longitude, latitude, and elevation, respectively. All Earth-based spatial–temporal location and extent references should, ideally, be relatable to one another and ultimately to a "real" physical location or extent. This key characteristic of GIS has begun to open new avenues of scientific inquiry.

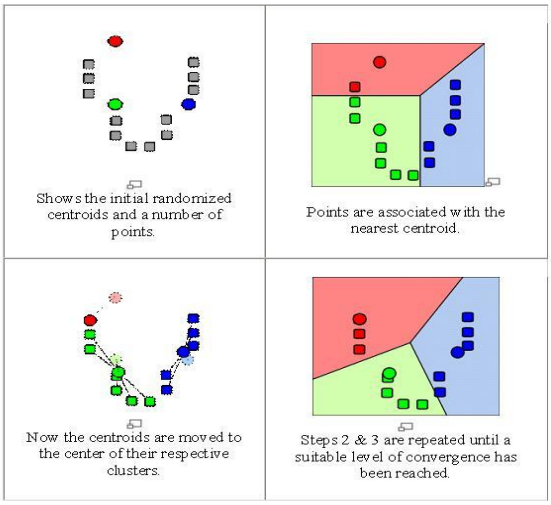

Fig.4.1. GIS model diagram.

Rural road development is identified as the key touchstone principle for the overall development of the country. The development has to be a planned development and the orientation of roads must be in scientific manner to promote sustainable development. This can be achieved by a hierarchical road network development. Hierarchy in connectivity of villages is an important issue to be dealt in the case of rural roads in developing countries. The villages with less demand potential are connected to the major district roads as well as to the extent of National Highways. The level of hierarchy is not maintained in almost all the rural areas. This improper planning of the network will have a profound influence on the development phase of the rural area. Hence the connectivity must be based on the demand potential of the village.

Potential is a processed value from demographic, socio and economic characteristics, which promotes activity and transitions the vacant land of village to dominated activating centres. Travel in rural areas is inconsistent, less frequent and dependant on supply orientation of the system. Due to this, it may not be able to identify demand oriented linkages precisely among the villages. In order to develop the activities in villages and enable them to have sufficient supply facilities and trip generation characteristics, a reflection of such travel, which governs all the characteristics of travel demand is identified in terms of demand potential. Demand potential is promoted a proxy to travel demand which is used as an analytical tool for compositor units and administrative units of the study area.

5. CONCLUSION:

This analysis has confirmed the need for road network planning, which can achieve the desired

results of economic, social interactions and overall development of the region. This study involves a methodology for grouping the villages into clusters based on the inherent demand in the various demographic, socio- economic and facility profiles of each village. Integrated modelling frameworks of clustering and GIS techniques are found to be extremely useful in proposing the connectivity patterns based on the demand potential. This methodology can be useful in suggesting the network orientation in rural areas where there is diverse travel behaviour and many numbers of attributes contributing to activity generation. GIS has proved to be a supporting tool in analysing the cluster patterns and in developing a rural road network orientation. This approach provides a road network plan for all villages in a district in a scientific pattern that promotes fast development of the area and also provides accessibility and connectivity to all the habited clusters in the area of study.

REFERENCES:

[1] CROW. 1989. Verkeersmaatregelen in het buitengebied (Traffic measures in rural areas.) Mededeling 21, Ede, Netherlands. (In Dutch).

[2] Jaarsma, C.F. 1991. Categories of rural roads in The Netherlands: functions, traffic characteristics and impacts. Some problems and solutions. In Proc. XIXth World Road Congress, PIARC-publication 19.52E: 101-103. Marrakech, Morocco, 22-28 September.

[3] Jaarsma, C.F. 1994. Rural low-traffic roads (LTRs): the challenge for improvement of traffic safety for all road users. In Proc. 27th ISATA, dedicated Conference on Road and Vehicle Safety, 177-183. Aachen, Germany, 31 October 31 - 4 November.

[4] Jaarsma, C.F. 1997. Approaches for the planning of rural road networks according to sustainable land use planning. Landscape and Urban Planning 39 (1):47-54.

[5] Jaarsma, C.F. and C.R. Baltjes. 1995. Herinrichting Kust West Zeeuwsch-Vlaanderen: ontsluiting onder de loep. Eindrapport: varianten voor een ontsluitingsstructuur met verkeersprognose en effectbepaling. (Reconstruction of the coastal region West Zealand Flanders: accessibility scrutinized). Nota vakgroep Ruimtelijke Planvorming 59, Wageningen, Netherlands. (in Dutch).

[6] Jaarsma, C.F. and F. van Langevelde. 1996. The motor vehicle and the environment: balancing between accessibility and habitat fragmentation. In Proc. 29th ISATA, dedicated Conference on the Motor Vehicle and the Environment, 299-306. Florence, Italy, 3-6 June.

[7] Jaarsma, C.F. and F. van Langevelde. 1997. Right-of-way Management and habitat fragmentation: an integral approach with the spatial concept of the Traffic Calmed Rural Area. In Proc. 6th International Symposium Environmental Concerns in Rights-of-way

[8] Jaarsma, C.F., J.O.K. Luimstra and T.J. de Wit. 1995. De kortste weg naar een verkeersleefbaar platteland. Onderzoek ruraal verblijfsgebied Ooststellingwerf. (The shortest path to a liveable rural area. A traffic and transportation plan for a residential rural area in Ooststellingwerf.) Nota vakgroep Ruimtelijke Planvorming 58, Wageningen, Netherlands. (In Dutch).

[9] Koornstra, M.J., M.P.M. Mathijsse and J.A.G. Mulder. 1992. Naar een duurzaam veilig wegverkeer: nationale verkeersveiligheid voor de jaren 1990 - 2010. (Towards a sustainable safe road traffic: national traffic safety for the period 1990-2010). SWOV, Leidschendam, Netherlands. (In Dutch).

